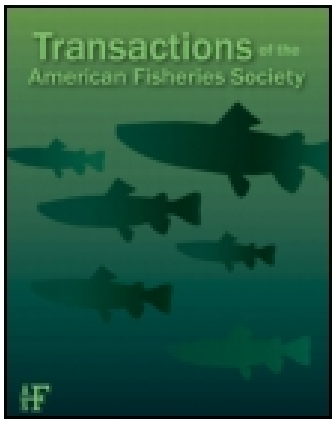

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A Review of "Regional Fisheries Oceanography of the California Current System: The CalCOFI Program"

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BOOK REVIEW

Regional Fisheries Oceanography of the California Current System: The CalCOFI Program. *By Sam McClatchie. Springer, New York. 2014. 235 pages. $189 (hardcover), $149 (e-book).*

This lovely book is aimed at graduate students in oceanography and researchers with special interests in both the California Current and how the California Current Cooperative Fisheries Investigation (CalCOFI) Program, now in its 65th year, became the successful observation program that it is. I thoroughly enjoyed the book, largely because it is *not* a boring compendium of what physical and biological oceanographers have published over the past 50 years but rather a synthesis of how physical forcing at various time and spatial scales affects the biological oceanography and fisheries of the California Current. Another feature that I enjoyed is the author's obvious passion for the subject as he describes the many connections between physical forcing and biological responses in the California Current. In that spirit, he periodically adds his own views on the status of our understanding and suggests where future work might be needed, complete with alternative hypotheses. You will not often find such refreshing comments in other books of this nature.

An often overlooked part of any book is the preface, but in this case I recommend reading this before attempting to assimilate the details in the book, as it provides a tidy summary of why the book was written and why the contents are what they are (and why some seemingly important topics are not covered). Chapter 1 provides a brief overview of how the decline in Pacific Sardine *Sardinops sagax* landings in the late 1940s led to the initiation of the CalCOFI Program in 1949. This chapter also reminds us that fish landings in the California Current System continue to be dominated by coastal pelagic species. For this reason, the book is structured around the paradigm that to understand how environmental variability might affect pelagic fish stocks and the fishery for them one must first have a basic understanding of the physical oceanography of the California Current System (CCS). Thus the second chapter ("Oceanography of the Southern California Current System Relevant to Fisheries") is logically focused on those physical features that are most relevant to fisheries oceanography. The opening section of this chapter provides a balanced review of historical thinking on why/how advection rather than coastal upwelling accounts for variations in zooplankton biomass in the CCS. This particular topic has always been somewhat controversial and remains unresolved to this day, since there has yet to be shown any correlation between zooplankton biomass (or species abundance, for that matter) and the strength of coastal upwelling. McClatchie drills this point home nicely. The chapter continues with a consideration of the importance of the spring transition, seasonal cycles of currents, wind relaxations, eddies, wind stress curl, and fronts to the resupply of nutrients and the production of phytoplankton and zooplankton.

Chapter 3 ("Classic CalCOFI") reviews the evolution of the types of sampling gear used to sample the zoo- and ichthyoplankton of the CCS (including the "invention" of the continuous underway fish egg sampler). Also included is a discussion of the CalCOFI Atlas series (35 published volumes of charts showing the distribution of hydrography and species of copepods, chaetognaths, euphausiids, salps, and doliolids, as well as fish larvae).

Chapter 4 ("Scales of Variability Relevant to Fisheries in the Southern California Current System") continues the theme of Chapter 2. Here you will find a succinct and scholarly discussion of the impacts of basin-scale physical forcing associated with the Pacific Decadal Oscillation (PDO), the North Pacific Gyre Oscillation, and the El Niño–Southern Oscillation on production in the CCS. Tucked into this chapter is a discussion of Pacific Sardine recruitment in relation to the oceanographic characteristics of their habitat. The author does a nice job explaining the promises and pitfalls associated with attempts to correlate climate indices such as the PDO with fish recruitment time series. This chapter is the "meat and potatoes" of the book. If you only have time to digest one chapter, this is the one to study, especially if you are a beginning graduate student or a researcher new to the California Current. But a word of caution: this chapter will require careful study because it is quite technical and not "light reading."

Chapters 5, 6, and 7 are short (28 pages in total). They summarize succinctly the experimental and predation studies of early life history stages of Northern Anchovies *Engraulis mordax* (Chapter 5), the ways in which CalCOFI data have been used in formal stock assessments (Chapter 6), and the contributions that the CalCOFI data sets are making toward an integrated ecosystem assessment of the CCS, a new initiative of the National Marine Fisheries Service. Chapter 7 discusses the role that the CalCOFI Program has played in the evolving science of ecosystem based management and the importance of CalCOFI to the nacent effort to produce an integrated ecosystem assessment of the entire California Current, from the CalCOFI region (the southern California Current) to the northern end (off Oregon and Washington). Included in Chapter 7 is a nice discussion of the value of mesopelagic ichthyoplankton and forage fish as indicators of ecosystem change.

The final chapter (Chapter 8) is a gem and should be of greatest interest to everyone because it contains a set of vignettes written by 25 accomplished scientists—many old, some young—in which each shares their perspective on the importance of the CalCOFI Program to them and of how involvement in the program has influenced their professional careers. This rather unique chapter is delightful and comes complete with photos of old timers from their early days. No essay in this chapter is better than any other—rather, all are great fun to read. What I think many readers will note, and miss, is the absence of essays by deceased heroes, many of whom left us long ago but others more recently, including Ed Fager, Abe Fleminger, John Isaacs, Mike Mullen, Joe Reid, and Ed Brinton.

Overall, I thoroughly enjoyed this book and believe that regardless of their background readers will come away from it more enlightened.

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